



■ General Description

JY1105A series are CMOS positive voltage linear regulators with low current consumption, high accuracy output, output high speed, low dropout voltage and 500mA(Maximum) output. High accuracy output voltage $\pm 1.5\%$ is realized by using laser trimming technology. The charged output capacitor can be discharged with an internal switch by making EN=VSS, as a result Vout quickly returns to the Vss level. JY1105A have both Thermal Shutdown, and Current limit to prevent device damage under the worst of operating conditions. Low ESR capacitors are available for input and output capacitor.

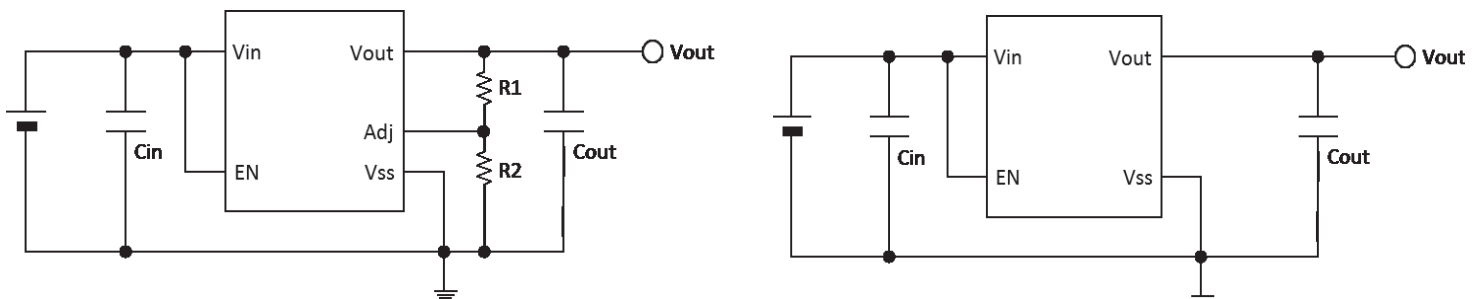
■ Features

- Fixed output voltage version.....0.8V~5.0V (selectable with a step of 0.05V)
- Adjustable output voltage version.....ADJ Reference Voltage=0.6V \pm 1.2%, (Available Vout=0.8V~5.0V)
- Operating input voltage.....1.7V~6.0V
- High accuracy output voltage..... $\pm 1.5\%$ (1.35V \leq Vout), ± 20 mV (Vout<1.35V) at +25 $^{\circ}$ C
- Maximum output current500mA
- Low dropout voltage.....Typ. 220mV (output=3.0V, Iout=300mA)
- Low quiescent current.....Typ. 60 μ A
- High ripple rejection.....Typ. 75dB at 1KHz
- Low ESR output capacitor.....1.0 μ F (1.2V \leq Vout), 3.3 μ F(Vout<1.2V)
- Low ESR input capacitor.....1.0 μ F
- Operating temperature range.....-40 $^{\circ}$ C to +85 $^{\circ}$ C
- Built-in over-current protector.....Limit current : 600mA (Typical)
- Built-in thermal shutdown circuit
- COUT high-speed auto-discharge
- Built-in On/Off circuit (EN)

■ Applications

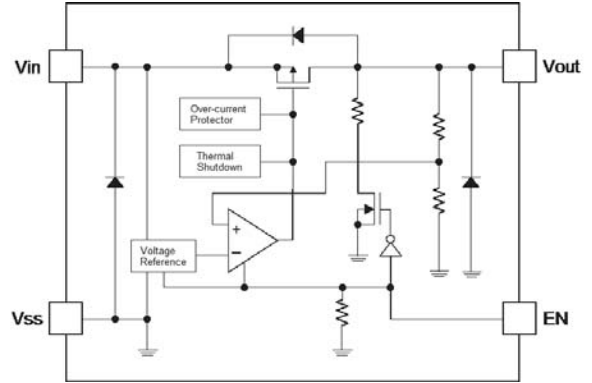
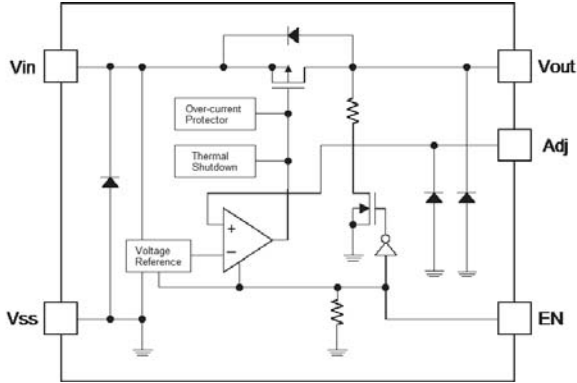
- Battery powered devices
- Cellular phone
- Digital / Video cameras
- Portable games
- Handheld instruments

■ Typical Application

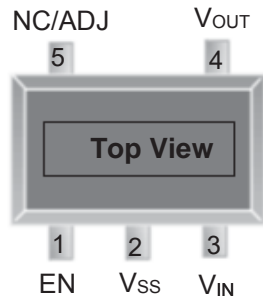




■ Functional Block Diagram(After molding)



■ Pin Configuration



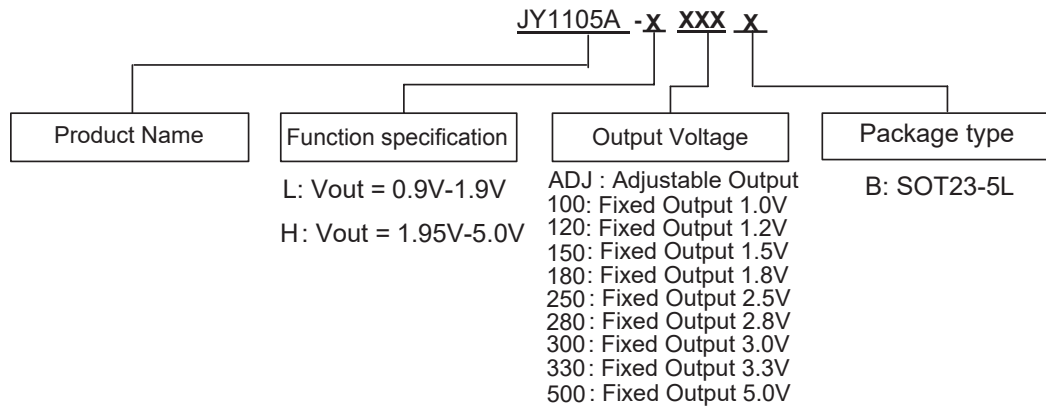
SOT23-5L

| SOT23-6L Pin No. | Symbol | Description |
|---------------------|------------------|------------------------------|
| 1 | EN | Chip enable |
| 2 | V _{SS} | Power ground |
| 3 | V _{IN} | Voltage input |
| 4 | V _{OUT} | Output |
| 5 | NC/ADJ | Non connection or adjustable |



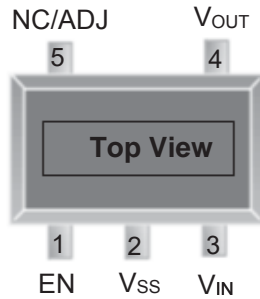
High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

Ordering Information

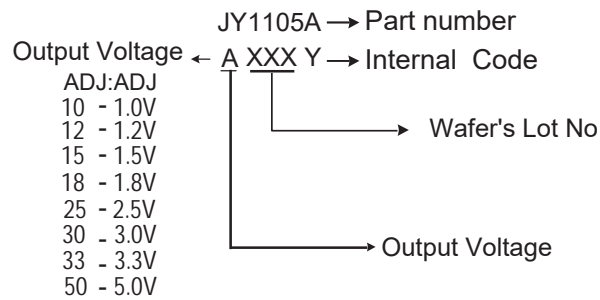




Marking Information



SOT23-5L





■ Absolute Maximum Rating

| Items | Symbol | Ratings | Unit |
|-----------------------------|--------|--------------------|--------------|
| Input voltage range | Vin | -0.3 to +7.0 | V |
| EN voltage range | VEN | -0.3 to +7.0 | V |
| Adj voltage range | Vadj | -0.3 to +7.0 | V |
| Output current | Iout | Pd/(Vin-Vout) | mA |
| Output voltage range | Vout | Vss-0.3 to Vin+0.3 | V |
| Power dissipation | SOT-25 | Pd | 400 (on PCB) |
| Operating temperature range | Topr | -40 to +85 | °C |
| Storage temperature range | Tstg | -55 to +125 | °C |

■ Electrical Specifications(1)

(Ta = 25°C, unless otherwise noted.)

| Items | Symbol | Conditions | Min. | Typ. | Max. | Unit | Test Circuit | |
|----------------------------|--------|--|---------------------|----------------|-------|----------------|--------------|---|
| Output voltage | Vout | Vin=Vout+1.0V, Iout=30mA JY1105A | Vout ≥ 1.35V | Vout ×0.985 | Vout | Vout ×1.015 | V | 1 |
| | | | Vout < 1.35V | Vout -20 | Vout | Vout +20 | mV | 1 |
| ADJ Reference Voltage | Vadj | JY1105A-ADJ | 0.593 | 0.600 | 0.607 | V | 2 | |
| Output current | Iout | Vin=Vout+1.0V | 0.8V ≤ Vout ≤ 1.15V | 300 | - | - | mA | 1 |
| | | | 1.2V ≤ Vout ≤ 1.65V | 300 | - | - | | |
| | | | 1.7V ≤ Vout ≤ 2.25V | 300 | - | - | | |
| | | | 2.3V ≤ Vout ≤ 2.85V | 300 | - | - | | |
| | | | 2.9V ≤ Vout ≤ 3.45V | 300 | - | - | | |
| | | | 3.5V ≤ Vout ≤ 4.05V | 300 | - | - | | |
| Dropout voltage (Note1) | Vdif | Iout=300mA (Vin ≥ 1.7V) | 0.8V ≤ Vout ≤ 1.15V | - | - | 900 | mV | 1 |
| | | | 1.2V ≤ Vout ≤ 1.65V | - | - | 500 | | |
| | | | 1.7V ≤ Vout ≤ 2.25V | - | 305 | 400 | | |
| | | | 2.3V ≤ Vout ≤ 2.85V | - | 250 | 340 | | |
| | | | 2.9V ≤ Vout ≤ 3.45V | - | 220 | 300 | | |
| | | | 3.5V ≤ Vout ≤ 4.05V | - | 210 | 290 | | |
| | | | 4.0V ≤ Vout ≤ 5.00V | - | 205 | 285 | | |

Note1: Dropout Voltage is measured at Vout=Vout(nominal)×0.98, { Vout(nominal) is measured at Vin=Vout+1.0V }



■ Electrical Specifications (2)

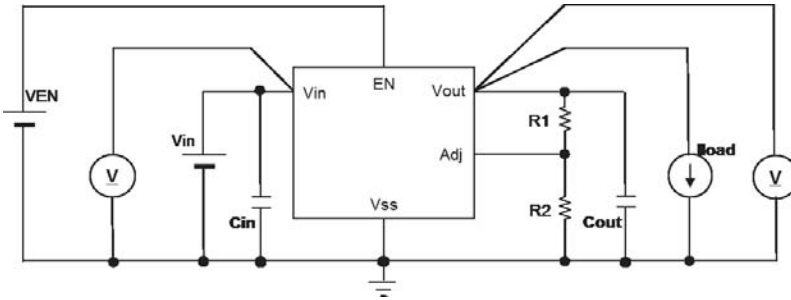
(Ta = 25°C, unless otherwise noted.)

| Items | Symbol | Conditions | Min. | Typ. | Max. | Unit | Test Circuit | |
|--|---------------------|--|------------------|------|------|----------|--------------|---|
| Current consumption | Iopr | Vin=Vout+1.0V, Iout=0mA | - | 60 | 90 | μA | 3 | |
| Standby current | Istb | EN=Vss | - | 0.02 | 0.2 | μA | 3 | |
| Input voltage | Vin | | 1.7 | - | 6.0 | V | - | |
| Load regulation | ΔVout/Vout | Vin=Vout+1.0V, Iout=0.1mA to 300mA | Vout<1.35V | - | 0.1 | 0.7 | abs(%) | 1 |
| | | | 1.35V≤Vout<2.30V | - | 0.1 | 0.6 | | |
| | | | 2.30V≤Vout | - | 0.1 | 0.5 | | |
| Line regulation | ΔVout / (ΔVin•Vout) | Vout+1.0V≤Vin≤6.0V, Iout=30mA | - | 0.01 | 0.1 | abs(%/V) | 1 | |
| Ripple rejection | Rr | Vin=Vout+1.0V, f=1KHz, ΔVrip=0.5Vp-p, Iout=30mA | - | 75 | - | dB | 4 | |
| Limit current | Ilimit | Vin=Vout+1.0V | 450 | 600 | - | mA | 1 | |
| Short circuit current | Ishort | Vin=Vout+1.0V, Vout=0V | - | 100 | - | mA | 5 | |
| Output voltage temperature coefficient | ΔVout / ΔTa•Vout | Iout=30mA, Ta= -40°C to +85°C | - | ±20 | - | ppm/°C | 1 | |
| Adj input bias current | Iadj | Adj=0.6V, JY1105A | -0.1 | - | 0.1 | uA | 6 | |
| EN high level voltage | Venh | | 1.2 | - | 6 | V | 1 | |
| EN low level voltage | Venl | | - | - | 0.3 | V | 1 | |
| EN high level current | Ienh | EN= Vin= 6.0V | 0.3 | - | 5 | μA | 7 | |
| EN low level current | Ienl | EN= Vss | -0.1 | - | 0.1 | μA | 7 | |
| Cout auto-discharge resistance | Rdis | Vin=6.0V, Vout=4.0V, EN= Vss | - | 100 | - | Ω | 5 | |
| Thermal Shutdown Temperature | Ttsd | Shutdown, temperature increasing | - | 150 | - | °C | 1 | |
| Thermal Shutdown Release Temperature | Ttsr | Release, temperature decreasing | - | 120 | - | °C | 1 | |

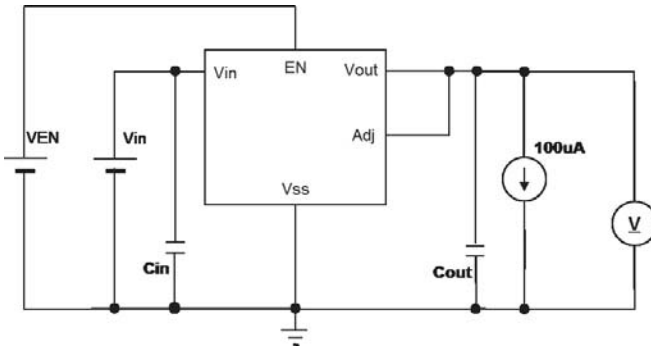


■ Test Circuits

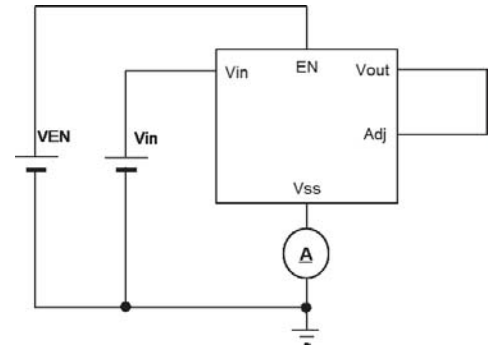
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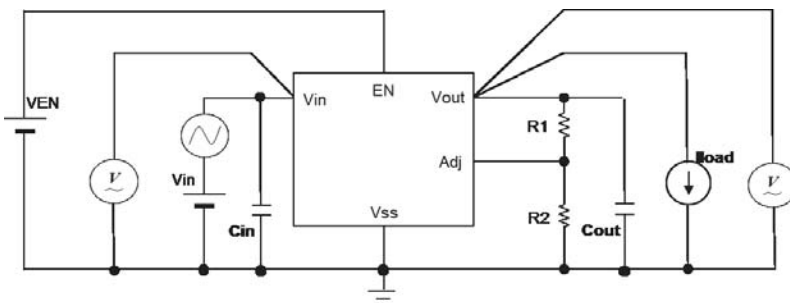
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3



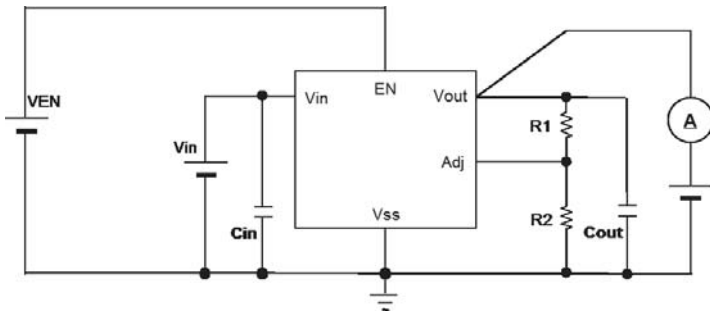
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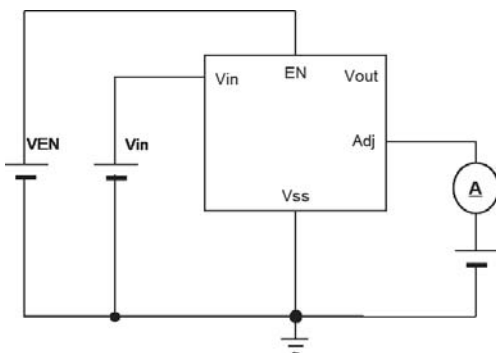


High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

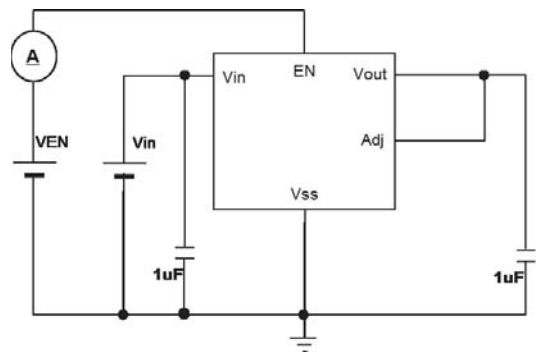
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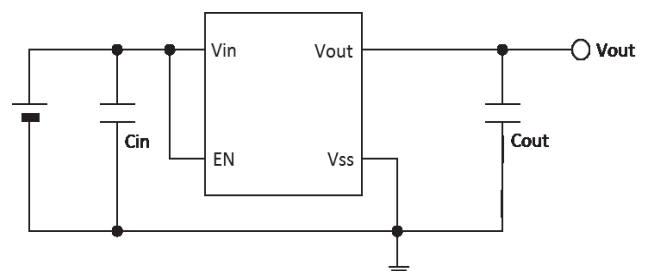
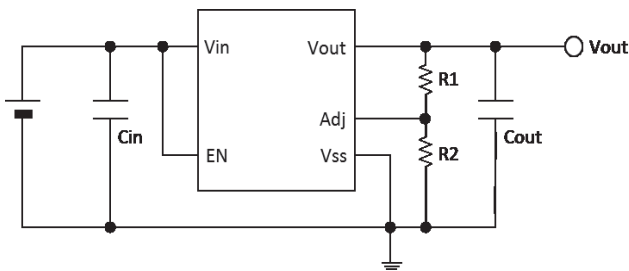
6



7



■ Detailed Description





Input and Output Capacitor Requirements

| Minimum Capacitance | $V_{out} < 1.2V$ | $1.2V \leq V_{out}$ |
|---------------------|------------------|---------------------|
| Cin | $\geq 1\mu F$ | $\geq 1\mu F$ |
| Cout | $\geq 3.3\mu F$ | $\geq 1\mu F$ |

X5R- and X7R-type ceramic capacitors are recommended because these components have minimal variation in value and equivalent series resistance (ESR) over temperature and will offer the best AC performance.

JY1105A is stable with an output capacitor to ground. 3.3uF or greater in case of $V_{out} < 1.2V$.

1uF or greater in case of $V_{out} \geq 1.2V$.

And an input capacitor is also important for the stability of JY1105A . Place 1uF or greater between V_{in} and ground. Input and output capacitors should be placed as close to JY1105A as possible.

Vout setting of Adjustable Version

Adjustable version uses external feedback resistors to generate an output voltage. The output voltage from 0.8V to 5V are available. V_{adj} is trimmed to 0.6V and V_{out} is given by the following equation.

$$V_{out} = V_{adj} * (1 + R1 / R2)$$

Feedback resistors R1 and R2 should be high enough to keep quiescent current low, but increasing $R1 + R2$ will reduce stability. In general, R1 and R2 in the tens of kohm will produce adequate stability. In the same way as capacitors, place R1 and R2 close to JY1105A . Because these form the negative feedback loop of LDO, The distance from resistances to JY1105A influences the stability and other characteristics.

To improve stability characteristics, keep parasitics on the Adj pin to a minimum, and lower R1 and R2 values.

EN pin

EN pin is Active high. When EN pin is opened or is forced to be low, the Pch MOS pass transistor shuts off, and all internal circuits are powered down. In this standby state, the current consumption decreases to 0.2uA maximum at room temperature. EN pin is pulled down by 4MΩ resistance internally.

Internal Current Limit

JY1105A has internal over load current limit protection circuit. This limits the Pch MOS pass transistor current to 600mA. So, against excessive load, JY1105A limits it internally and the output voltage falls down.

Finally, when the output is shorted to GND level, the Pch MOS pass transistor current is limited to 100mA.

This is Short circuit current (I_{short}).

Thermal Shutdown

JY1105A has thermal shutdown circuit internally. This limits total power dissipation in JY1105A .

When the junction temperature T_j reaches approximately 150°C, the Pch MOS pass transistor shuts off the load current and allows JY1105A to cool. When the junction temperature T_j falls to approximately 120°C, JY1105A restart the regulation.

(Note)

Internal current limit circuit or Thermal shutdown circuit cannot completely protect JY1105A from the thermal fault conditions. The maximum output power of JY1105A is limited by the maximum power dissipation of the package. The maximum power dissipation should not exceed the package's maximum power rating.

And for reliable operation, junction temperature should be limited to +125°C maximum.

Power dissipation 'P' :

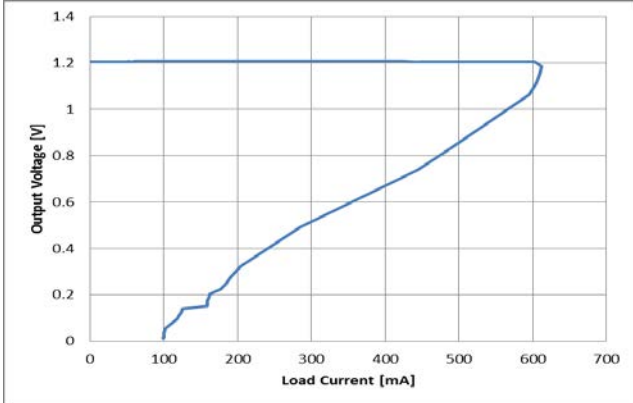
$$P = (V_{in} - V_{out}) * I_{out}$$



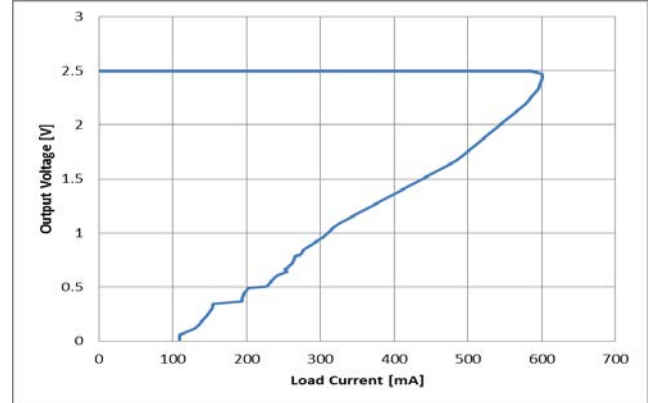
High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

Output Voltage vs. Load Current

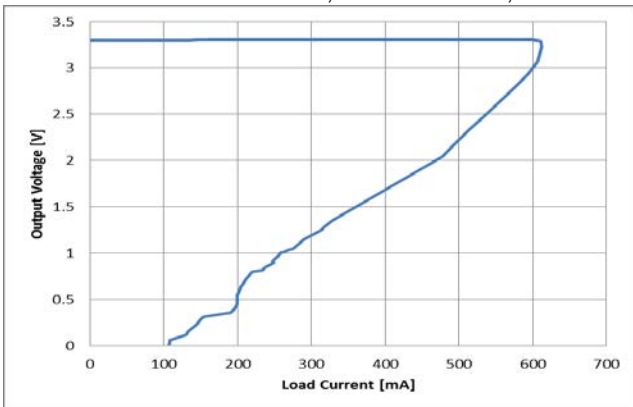
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Ta=+25°C



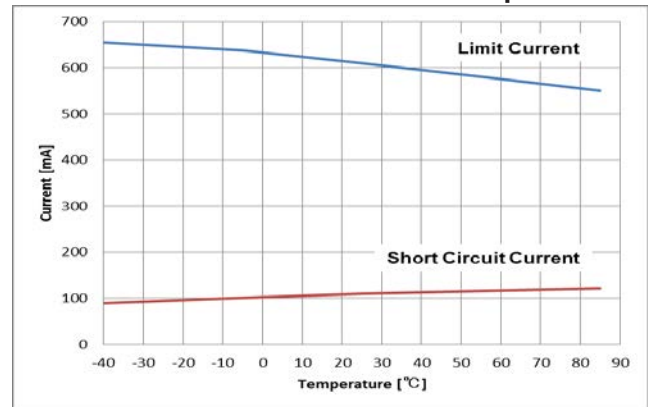
Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Ta=+25°C



Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Ta=+25°C

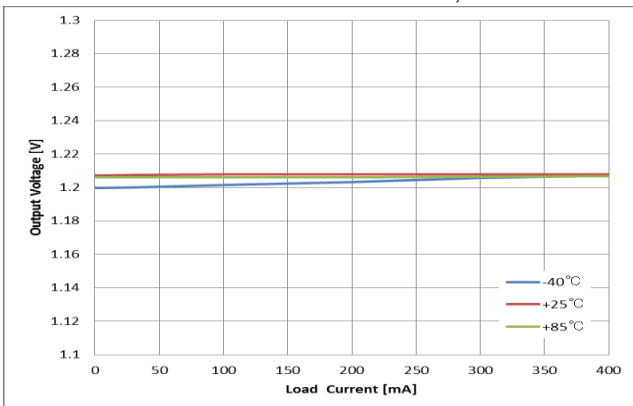


Limit Current, Short Circuit Current vs. Temperature

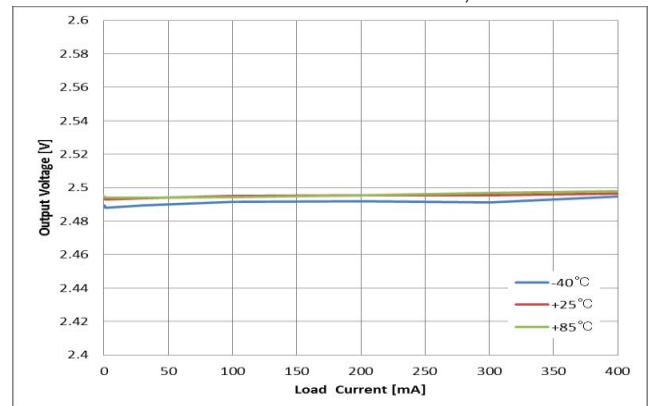


Load Regulation

Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF



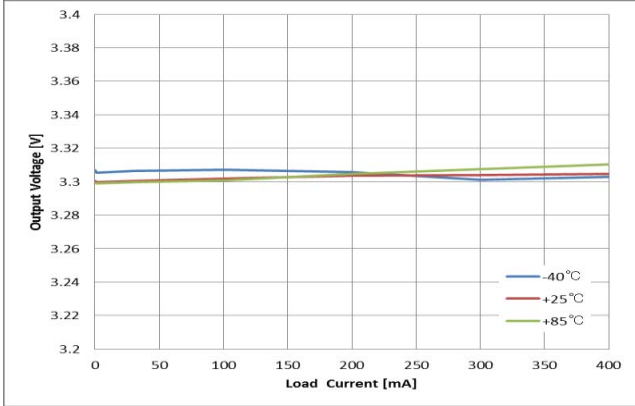
Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF





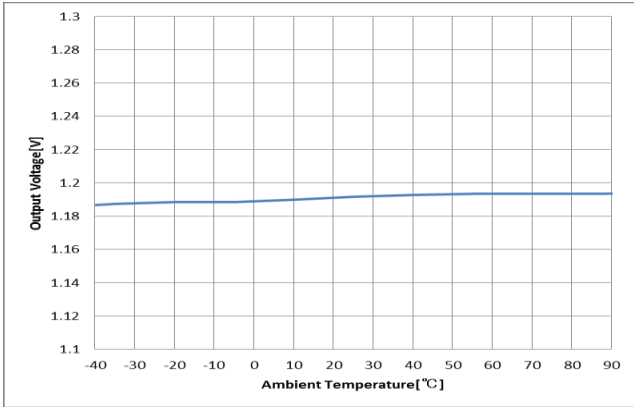
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Vin=EN=4.3, Cin=Cout=1uF

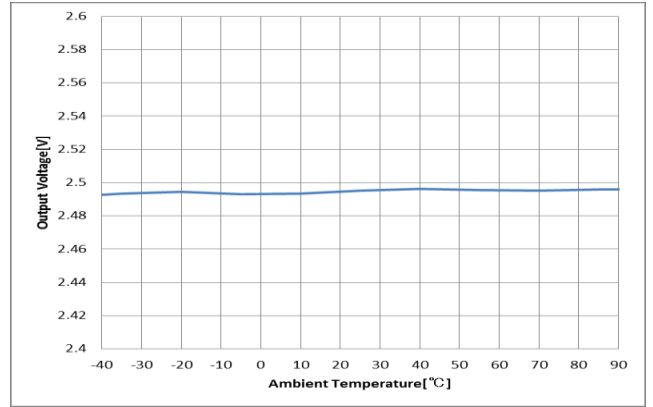


Output Voltage vs. Temperature

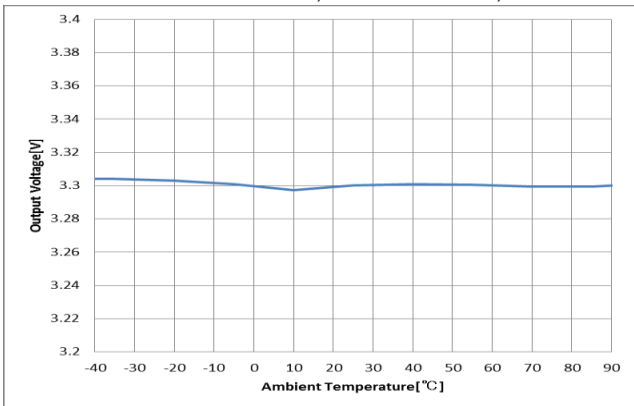
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Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Iout=30mA



Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Iout=30mA

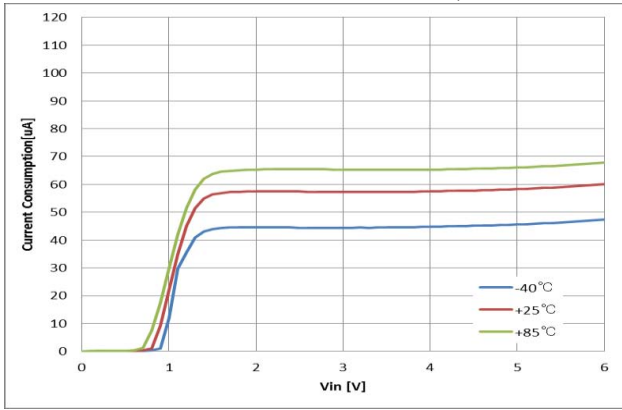




Current Consumption vs. Input Voltage

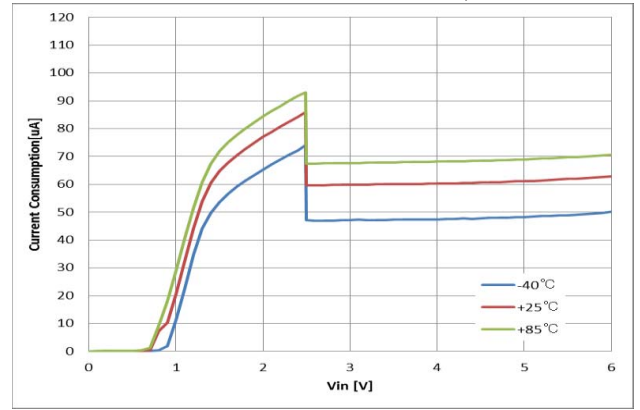
Vout=1.2V

Vin=EN, Cin=Cout=1uF



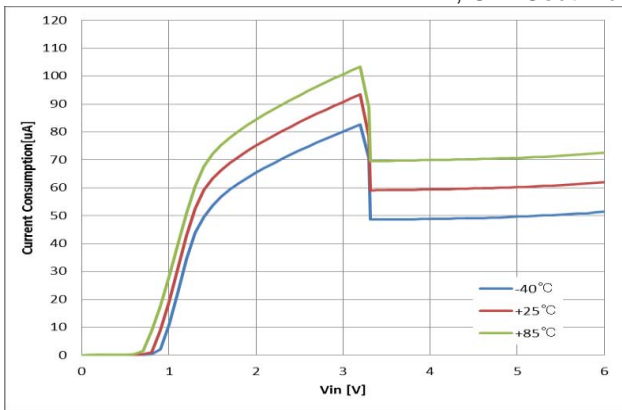
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Vin=EN, Cin=Cout=1uF



Vout=3.3V

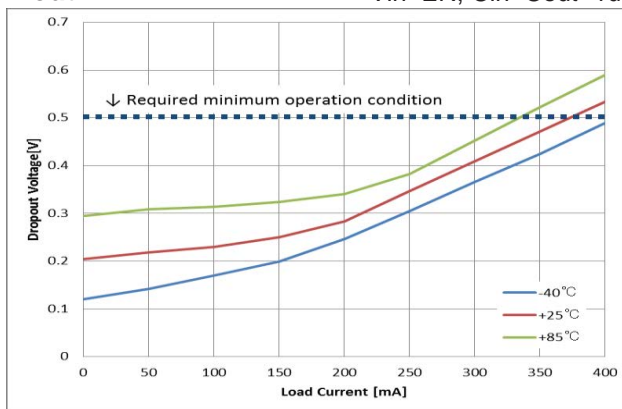
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Dropout Voltage vs. Load Current

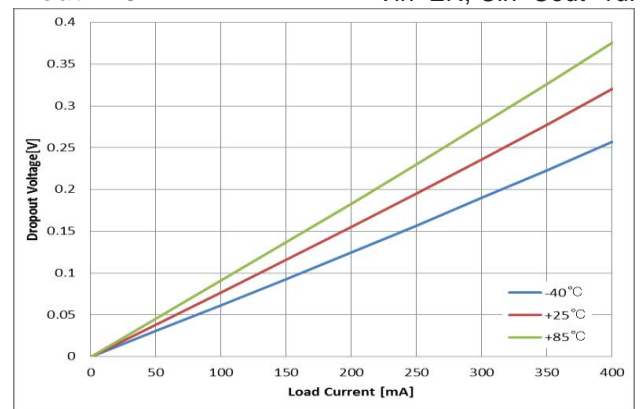
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Vin=EN, Cin=Cout=1uF



Vout=2.5V

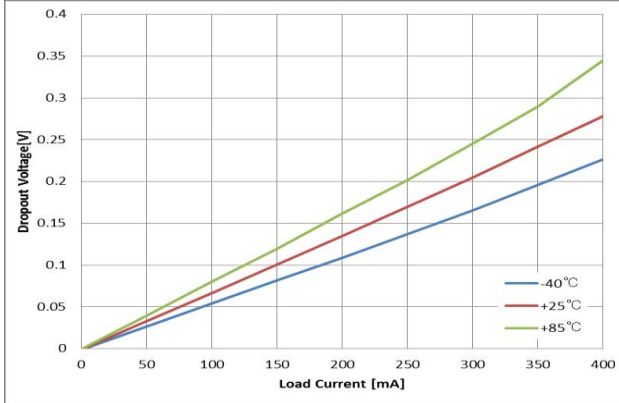
Vin=EN, Cin=Cout=1uF





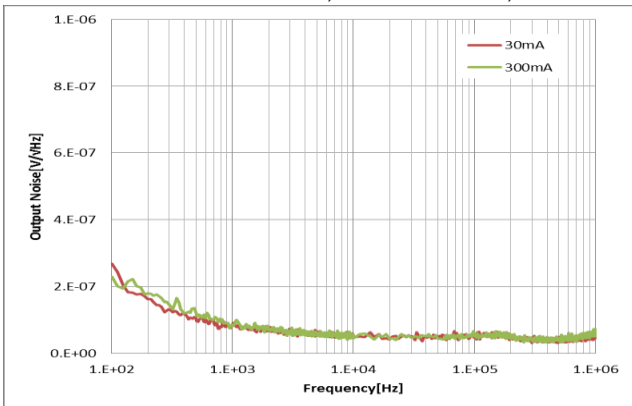
Vout=3.3V

Vin=EN, Cin=Cout=1uF

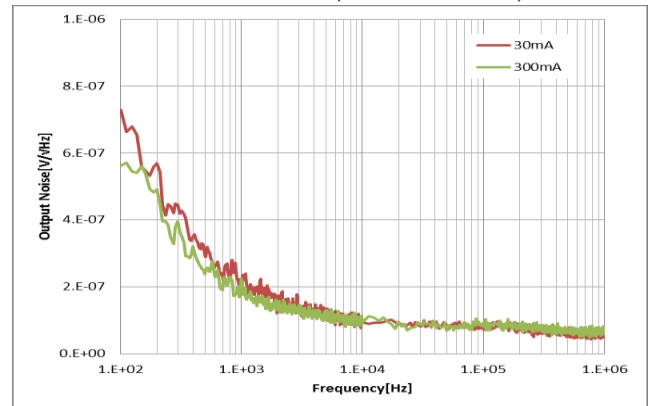


Output Noise vs. Frequency

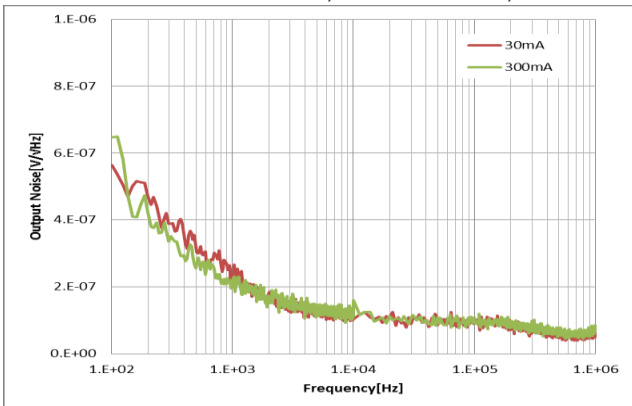
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Ta=+25°C



Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Ta=+25°C



Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Ta=+25°C

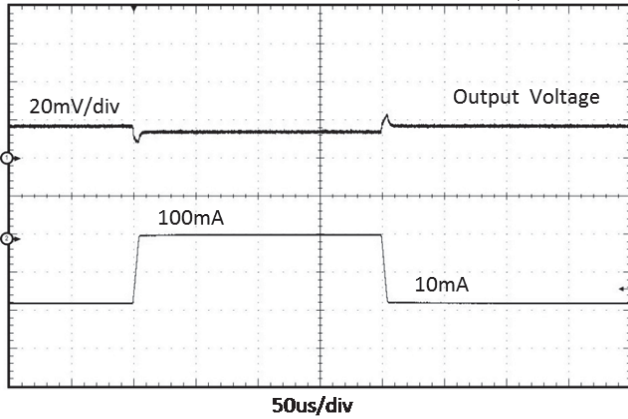




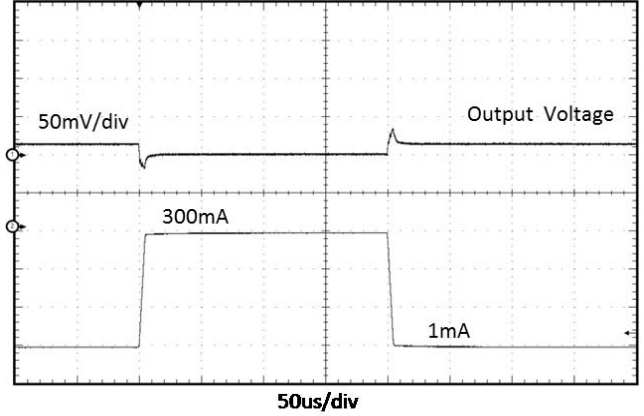
High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

Load Transient Response

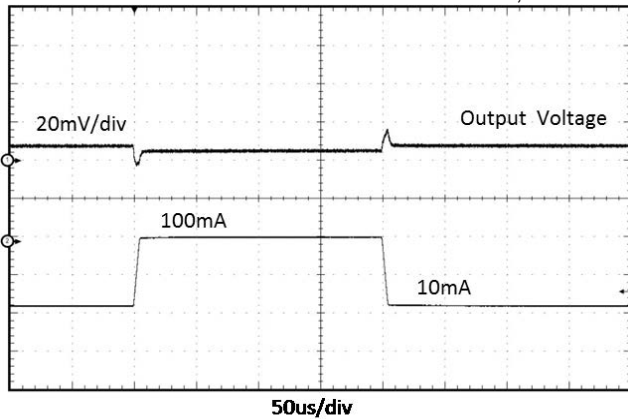
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Iout=10mA~100mA, tr=tf=5us



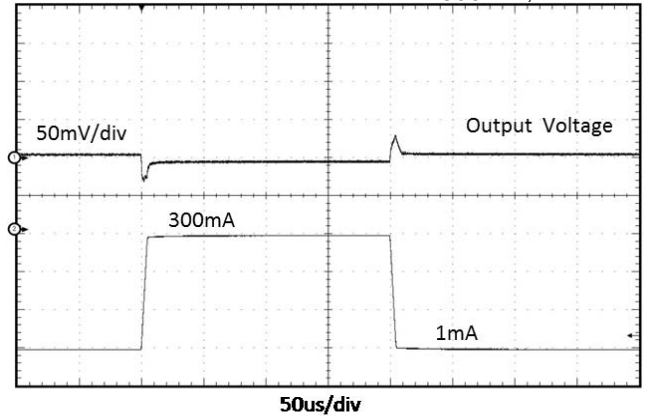
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Iout=1mA~300mA, tr=tf=5us



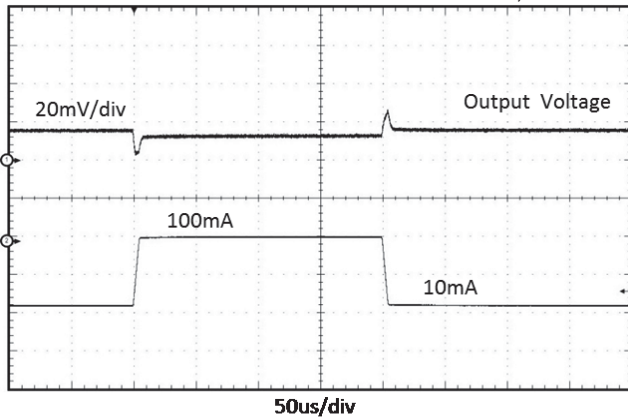
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Iout=10mA~100mA, tr=tf=5us



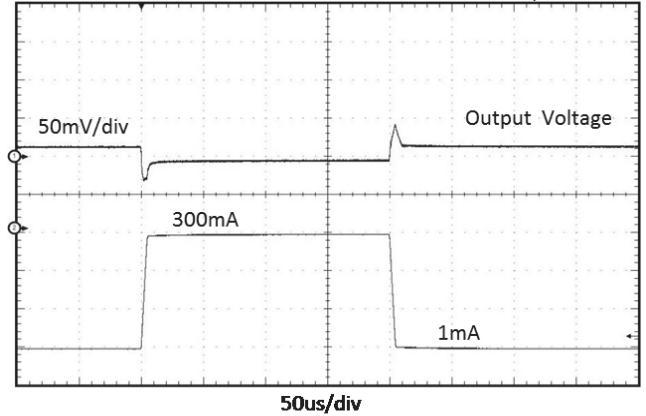
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Iout=1mA~300mA, tr=tf=5us



Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Ta=+25°C
Iout=10mA~100mA, tr=tf=5us



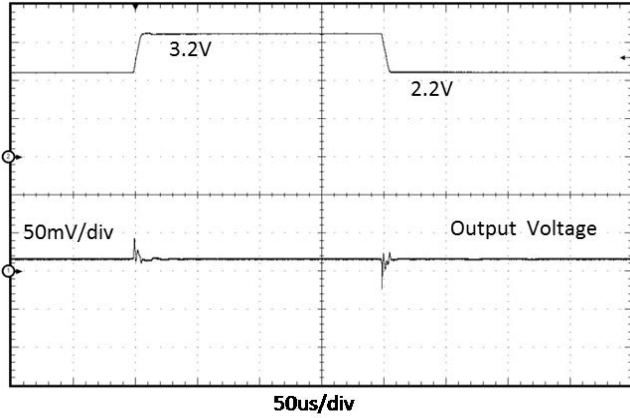
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Iout=1mA~300mA, tr=tf=5us



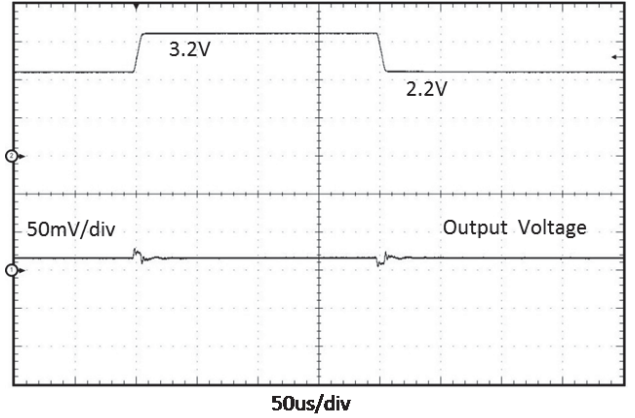


Line Transient Response

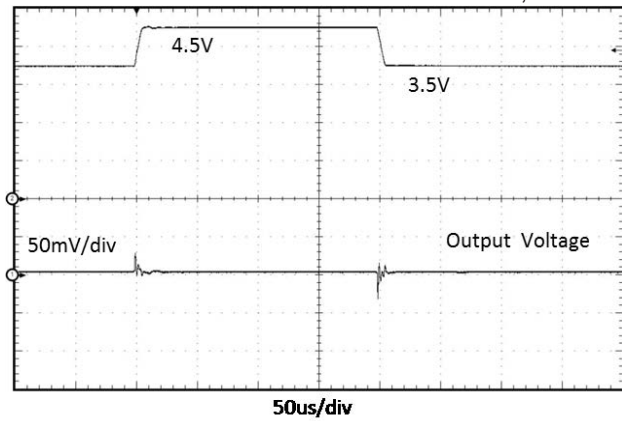
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Vin=EN=2.2V~3.2V, tr=tf=5us



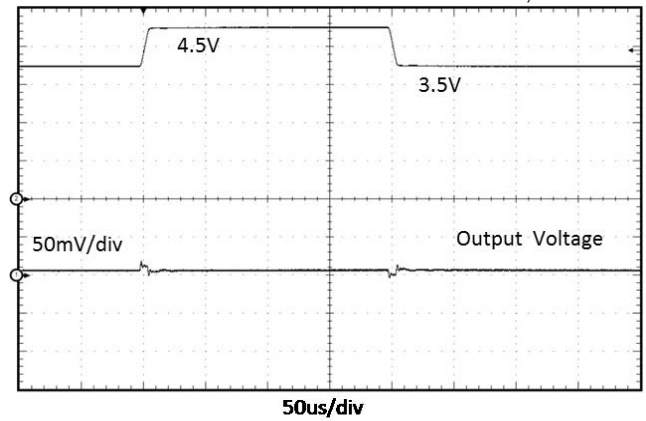
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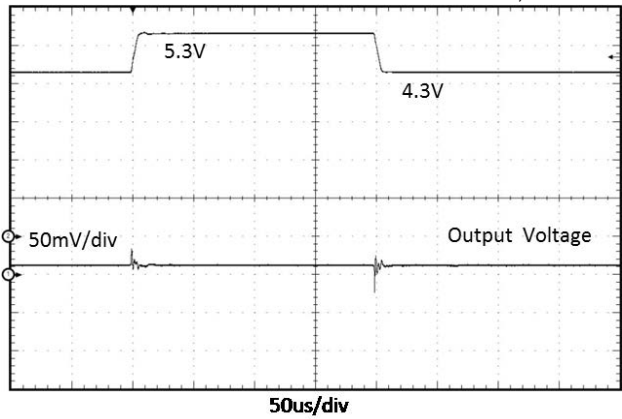
Vout=2.5V Iout=1mA, Cin=Cout=1uF, Ta=+25°C
Vin=EN=3.5V~4.5V, tr=tf=5us



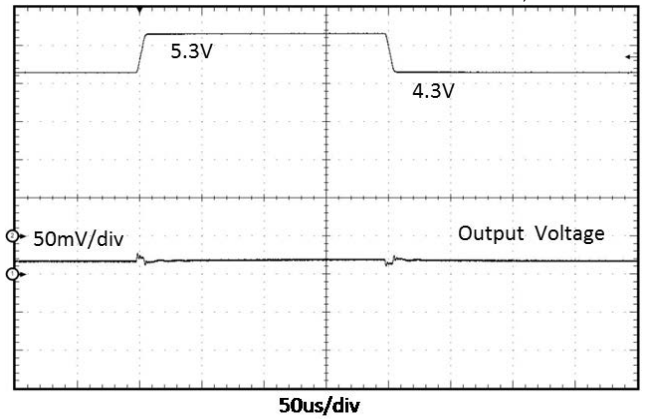
Vout=2.5V Iout= 300mA, Cin=Cout=1uF, Ta=+25°C
Vin=EN=3.5V~ 4.5V, tr=tf=5us



Vout=3.3V Iout=1mA, Cin=Cout=1uF, Ta=+25°C
Vin=EN=4.3V~5.3V, tr=tf=5us



Vout=3.3V Iout= 300mA, Cin=Cout=1uF, Ta=+25°C
Vin=EN=4.3V~5.3V, tr=tf=5us

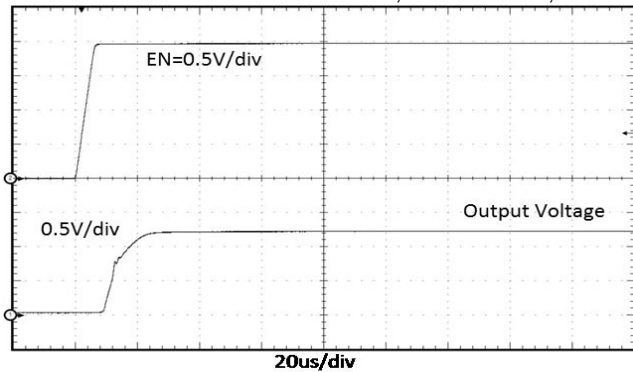




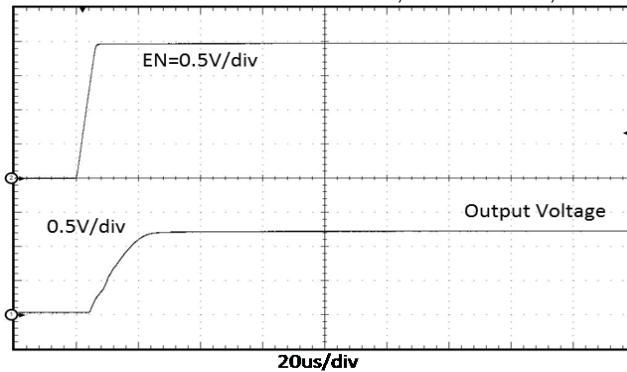
High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

EN Transient Response

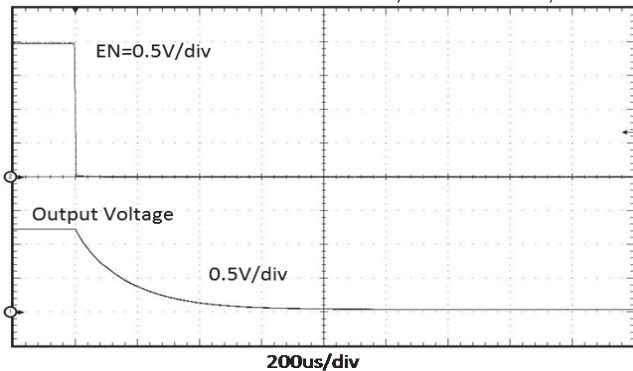
Vout=1.2V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=2.2V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



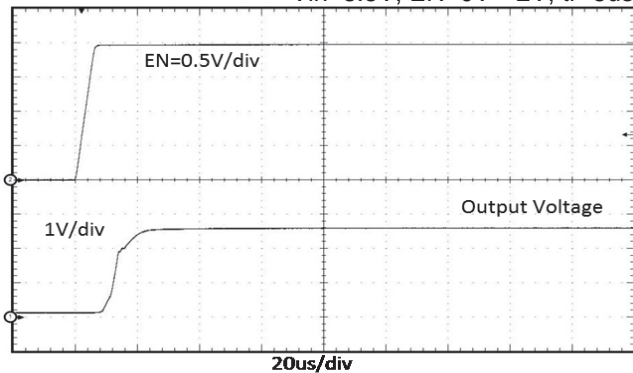
Vout=1.2V $I_{out}=100mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=2.2V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



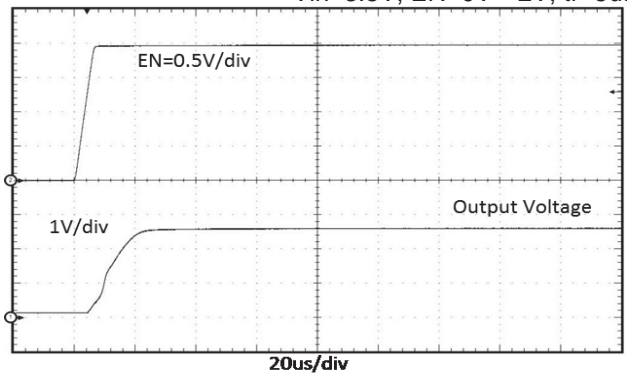
Vout=1.2V $I_{out}=0mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=2.2V$, $EN=2V \rightarrow 0V$, $t_r=5\mu s$



Vout=2.5V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=3.5V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



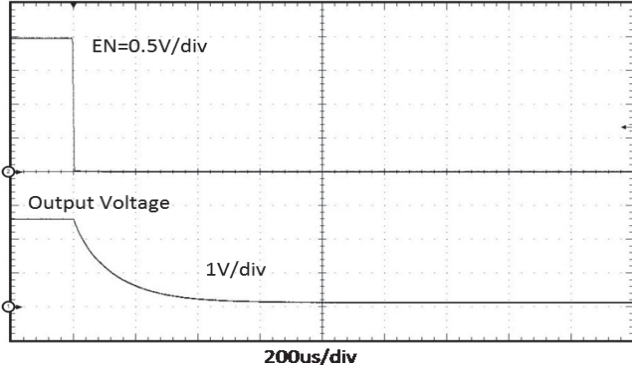
Vout=2.5V $I_{out}=100mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=3.5V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



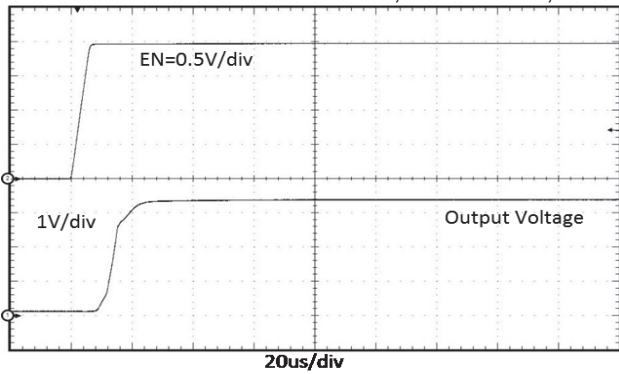


High speed, Low dropout, High output accuracy, Adjustable Output & Fixed Output

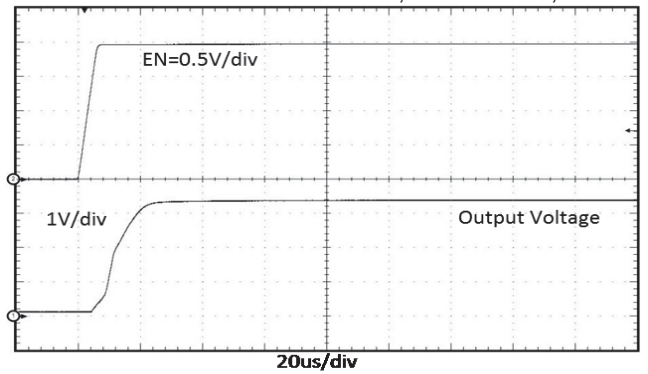
Vout=2.5V $I_{out}=0mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=3.5V$, $EN=2V \rightarrow 0V$, $t_r=5\mu s$



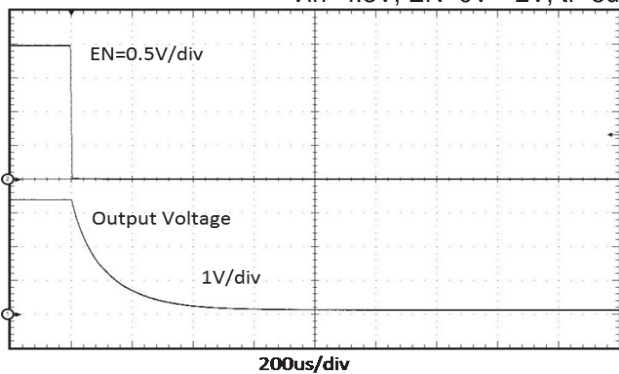
Vout=3.3V $I_{out}=1mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=4.3V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



Vout=3.3V $I_{out}=100mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=4.3V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



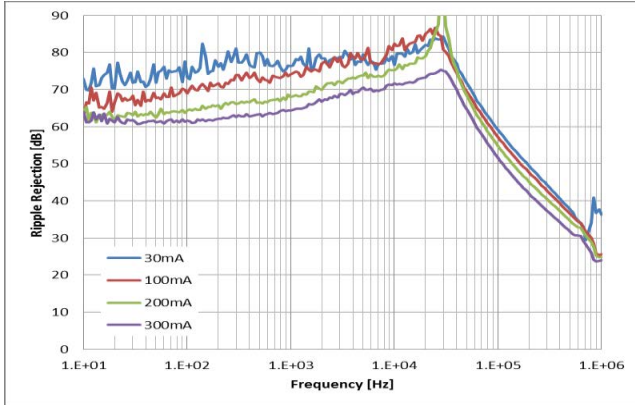
Vout=3.3V $I_{out}=0mA$, $C_{in}=C_{out}=1\mu F$, $T_a=+25^\circ C$
 $V_{in}=4.3V$, $EN=0V \rightarrow 2V$, $t_r=5\mu s$



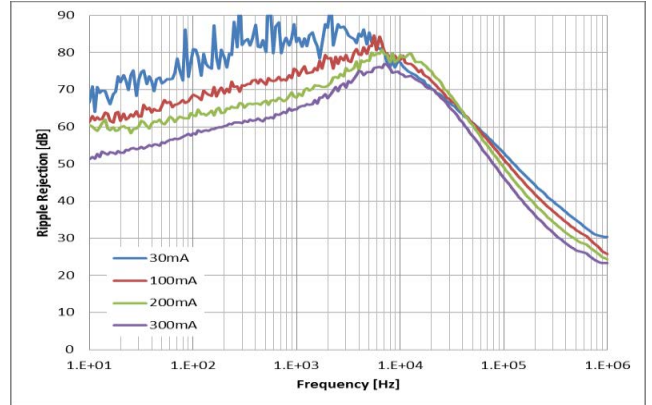


Ripple Rejection vs. Frequency

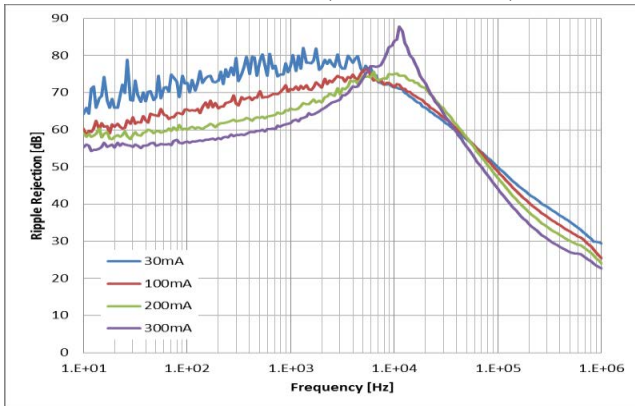
Vout=1.2V Vin=EN=2.2V, Cin=Cout=1uF, Ta=+25°C



Vout=2.5V Vin=EN=3.5V, Cin=Cout=1uF, Ta=+25°C

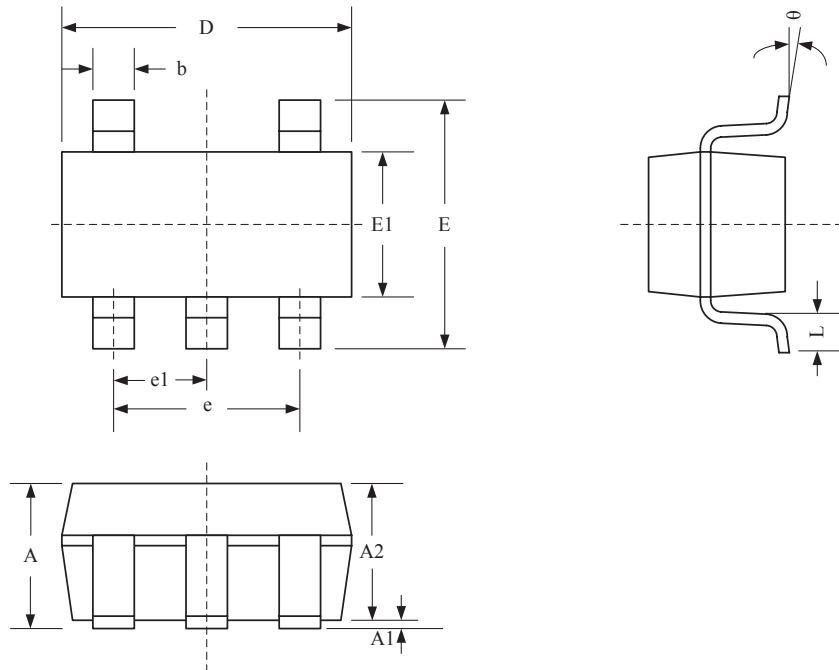


Vout=3.3V Vin=EN=4.3V, Cin=Cout=1uF, Ta=+25°C





PACKAGE DIMENSIONS (SOT23-5L)



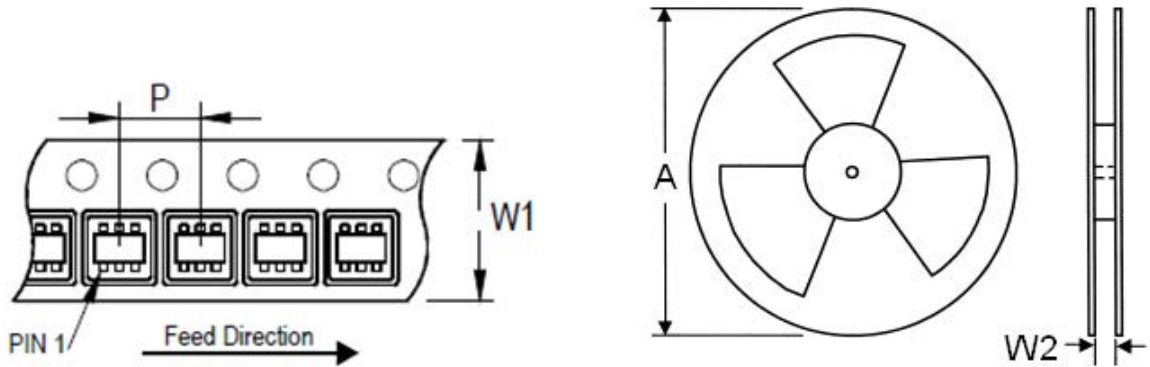
Package Dimensions (Controlling dimensions are in millimeters)

| Symbol | Dimensions (mm) | | | Dimensions (Inches) | | |
|--------|-----------------|---------|---------|---------------------|---------|---------|
| | Minimum | Typical | Maximum | Minimum | Typical | Maximum |
| A | — | — | 1.450 | — | — | 0.057 |
| A1 | 0.000 | — | 0.150 | 0.000 | — | 0.006 |
| A2 | — | — | 1.300 | — | — | 0.012 |
| b | 0.300 | — | 0.500 | 0.012 | — | 0.020 |
| D | 2.90 BSC | | | 0.114 BSC | | |
| e1 | 0.95 BSC | | | 0.037 BSC | | |
| e | 1.90 BSC | | | 0.075 BSC | | |
| E | 2.80 BSC | | | 0.110 BSC | | |
| E1 | 1.60 BSC | | | 0.063 BSC | | |
| L | 0.300 | 0.450 | 0.600 | 0.012 | 0.018 | 0.024 |
| θ | 0 | 4 | 8 | 0 | 4 | 8 |



Carrier Dimensions

SOT23-5L



| Tape Size (W1) mm | Pocket Pitch (P) mm | Reel Size (A) | | Reel Width (W2) mm | Empty Cavity Length mm | Units per Reel |
|----------------------|------------------------|---------------|-----|-----------------------|---------------------------|----------------|
| | | in | mm | | | |
| 8 | 4 | 7 | 180 | 8.4 | 300~1000 | 3,000 |